The Data of Labor Market in Turkey and Time Series Analysis on Economic Growth (2000:01-2013:03)

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Abstract

In the present study, labor markets were analyzed, in particular, the reasons of low labor force rate to make sense based on the data of Turkish economy. While in the advanced economies, the labor force rate is quite high and has small fluctuations around a certain extent over a long-term. In the Turkish economy, it prominently falls in a long-term. Turkey is 18th by population size and 17th by GDP in world ranking and although its population effectively provides labor force rate, it will be highly effective on its economic growth. The study that based on co-integration analysis with long-term of the labor data with respect to the economy of Turkey concluded that labor variables concern with GDP and co-integration in a long-term. In particular, when the presence of strong relation between the growth and the non-institutional population is produced, it is emphasized that the present relation between the growth and the labor variable isn't strong enough.

Keywords: Population, labor force rate, economic growth.

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1. Introduction

Even if the relation between population growth and economic growth is a discussed subject in the tradition of the classical economics, it is still the issue that isn't arrived at a consensus at the present time. The discussion base on the result is projected that if the population grows faster than GDP, the economy can't supply with the population. First of all, the discussion that is revived by Malthus (1798) made out the results in direction of population should be a controlled variable. Yet, when the largest world economies are considered at the present time, it will be seen that the largest economies are the countries with the most population. By WB data, the largest 20 economies of the world and their populations is shown on Table 1. Accordingly, 15 countries of the largest 20 economies in the world are also the one of 30 countries with the highest populations in the world.

Turkey is ranked at 17 by its economic growth and at 18 by its population but Turkey is ranked at 5th by unemployment rate among the largest 20 economies. And, it means that the unemployment rate is quite high but by its population structure. When the data of the labor force rate is examined, it has the lowest rate (with Italy 49%). In short course, it may be based on that even the economy of Turkey grows, the growth isn't supported enough by the population growth. And even if the population grows, labor force rate is low.

Table 1: GDP & Population in the world (2012)

The list of economy	Country	GDP	Population	The list of population	Unemployment	LFP
1	US	16,244	317,626	3	6,7	73,1
2	China	8,227	1,360,720	1	4,1	71
3	Japan	5,959	127,220	10	3,9	73,9
4	Germany	3,428	80,586	16	5,2	77,1
5	France	2,612	65,820	21	10,8	71
6	UK	2,471	63,705	22	7,1	77,1
7	Brazil	2,252	201,032	5	5,4	73,1
8	Russia Fed.	2,014	143,657	9	5,2	73
9	Italy	2,014	59,917	23	12,7	64,6
10	India	1,841	1,240,000	2	8,5	56
11	Canada	1,821	35,295	37	7,2	66
12	Australia	1,532	23,372	52	5,5	65
13	Spain	1,322	46,704	28	26,7	75,1
14	Mexico	1,178	118,395	11	4,9	64,5
15	Korea Rep.	1,129	50,219	26	7,5	66,4
16	Indonesia	0,878	249,866	4	6,1	68
17	Turkey	0,789	76,667	18	9,8	54
18	Netherlands	0,770	16,836	63	6,9	83
19	Saudi Arabia	0,711	29,994	42	12,1	52
20	Switzerland	0,631	8,122	97	3,1	68

The most distinct effect on the labor market of Turkey results from the seasonal weight of the agricultural sector. According to TSI, this effect is near to 30%. "In the peak periods of the agricultural activities, because the work force as an unpaid family worker take part in category of uninvolved to labor, labor force rate differ by the periods" (TSI 2012:31). But the data in the analysis, is used by purifying from the effect of season. Also, according to TSI, there are two reasons about the low of labor force rate. The first of these, "generally, the educational level of the population is low. When the educational level is more, the labor force rate is high".

The second is, "the labor force rate of women is low." (TSI 2012:32). In time, the reason of the fall of the labor force rate is based on the agricultural sector. It is said

that "In 1988, the labor force rate is 57,5 %, and in the same year, the share of the agricultural sector from the total employment is 46,5 %. In 2006, labor force rate falls to 48% by showing the continued downward trend, and the share of the agricultural sector from the total employment falls to 27,32%" (TSI , 2012:34). It is said that "the place in the business life of the women is limited so, labor force rate is low" by Bagdadioglu (2010). In this study, it emphasized that the relation between unemployment, labor, labor force rate and non-institutional population variables that is the base data of labor market, and growth.

The best discussed and the most frequently referred basic growth –employment and unemployment theories: It can be formed as Classic, Marxist, Keynesian, Neo-classic. Malthus's Law of Population is the most known in the Classical Theory, and it is the efficient approach to the classical theory. Malthus (1798) emphasizes the necessity of population control because of the future imbalance among the arithmetical increase in production of the foodstuff, even the geometrical increase in population. And, in Marxist approach (1976), the limiter of the labor demand is a capital stock. Therefore, the future "request labor" as the basic characteristic of capitalism will apply pressure on the prices. In the end, the rate of surplus value that is confiscated by capitalist will increase. And, it is presented as a natural expectation aimed at labor supply increase in the capitalist system. In Harrod (1948), Domar (1946), Singer as Keynesian approach growth model, it is said that population growth will affect negatively growth. The high population growth will affect negatively the growth process because it will cause the fall of quota per capita disposals. Finally, in Neo-classical Solow (1956) model, while the point in question the causality from the population to growth, the other way round is not valid. So, population growth increase the growth but the growth doesn't cause to increase the population growth. Although these theories that discuss the population as an exogenous variable, in intrinsic growth theories that suggest the growth theory as the intrinsic by concentrating the quality rather than the quantity value of population. The growth process can be supported as the intrinsic by the population with the investments such as education (Romer, 1986; Lucas, 1988), substructure (Grossman and Helpman, 1991) and R&D (Romer, 1990a; 1990;b).

The indirect relation between unemployment and growth rates is at issue since Okun (1962), and there are many studies (Amezaga, 2012; Arigo, 2001;Benigno, Ricci and Surico, 2010; Lee, 2000; Stock and Ludwig, 2010; Sögner, 2000; Lang and Peretti, 2009) that present the indirectly relation among the two valiables as the empiric. The studies (Uçak, 2013; Yılmaz, 2005; Ceylan and Sahin , 2010; Demirgil, 2010; Alancioglu and Utlu, 2012; Kesici,2010; Günes,2005; Yilmaz,2005; Barisik, Cevik and Cevik, 2010; Takim, 2010; Muratoglu, 2011) that do about the relation between unemployment and growth in Turkish economy, can present findings relating to entity of the indirectly relation.

2. Data and Method

In this study, the data of Turkish economy is used related to 2000:01-2013:03 period. Data got from TCMB-EVDS and TSI. GDP growth data is rate of increase GDP as US dollar. From the variables, Non institutional (POP) and labor (LAB) variables are stated with the number of persons. And, Labor force rate (LFP) and unemployment (UNE) variables that show modulating variation, are variables.

The analysis is formed by two processes. In First process, introductive statistics and correlation relations relating to variables is shown. In second process, the variables are tested whether or co-integrate in a long-term by using time series. Co-integration relation was made by using Johansen-Juselius co-integration. The prior condition for this test is to necessary "variables equal to stable". Therefore, principally for series, Dickey-Fuller and Philips-Perron unit root tests are in progress. For these tests;

$$\rho = Kor(X,Y) = \frac{Orv(X,Y)}{\sigma_x \sigma_y} = \frac{E[(X-\mu_X)(Y-\mu_y)]}{\sqrt{E[(X-\mu_X)^2]E[(Y-\mu_y)^2]}} \quad (1)$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \beta_3 Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-i} + u_t \quad (2)$$

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 trend + u_t \quad (3)$$

$$Y_t = \mu + A_1 Y_{t-1} + ... + A_p Y_{t-p} + u_t \quad (4)$$

The equations were used. 1 numbered equation for correlation relation among variables; 2 numbered equation for ADF unit root test; 3 numbered equation for PP test; 4 numbered equation for JJ tests. All variables were purged from the effect of season because of their quarters.

3. Findings

As the first part of analysis, the introductive statistics were calculated relating to the data and value received was shown in Table – 1.

Table 1: Introductive Statics

Variable	Average	Std. Error	Median	Max. and Min.
GDP	23,46	4,27	24,10	30,9/16,6
LAB	24404,9	1755,19	24030,31	28549/21933
UNE	10,17	1,75	10,18	14,89/5,89
LFP	48,49	1,63	48,73	51,64/45,71
POP	50373,55	2686,9	49916,98	55690,68/45927,41

While the labor force rate is 48,49% since the chosen period 2000:01-2013:03, average unemployment rate was calculated as 10,17%. And, while the non-institutional population is 45,927 in period 2000:01, it increased to 55,690 in period 2013:03.

The acquired correlation coefficients were shown in Table-2 by using 1 numbered correlation equation.

Table 2: Correlation Coefficients

Variable	GDP	LAB	UNE	LFP	POP
GDP	1	0,684224	0,263172	-0,02094	0,919314
LAB	0,684224	1	0,073315	0,660036	0,866821
UNE	0,263172	0,073315	1	-0,37332	0,340008
LFP	-0,02094	0,660036	-3,37332	1	0,226582
POP	0,919314	0,866821	0,340008	0,226582	1

Correlation relation among series is shown in Table-2. According to Table-2, the strongest correlation relation is between GDP and non-institutional population variable (0,919314). So, there is a quite strong relation between population growth and GDP. Other strong correlation relation between labor and KON (0,866821) and then between labor and labor force rate (0,660036).

The results belonging to ADF and PP tests are shown in Table-3 by using 2 and 3 numbered equations. When the statics ADF compared with the critical values for the semantic level 5% in brackets, it is seen unit root by the levels of all variables. Yet, the acquired test statics ADF is shown in ADF column by taking difference 1, and when it compared with the critical values in brackets, it is seen that all series become constant. In the present case, it was reached that all series are the result of I(1) as a result of ADF test. Also, it was reached the same results for PP test and was shown that all series are I(1) again.

Table 3: The results of ADF and PP Unit Root Tests

	ADF	ADF Δ	PP	PP Δ
GDP	-2,812154 (*-3,496960*)	-5,596515 (*-3,496960*)	-2,365321 (*-3,495295*)	-5,596515 (*-3,496690*)
LAB	-1,897907 (*-3,495295*)	-7,705218 (*-3,498692*)	-1,694650 (*-3,495295*)	-18,38391 (*-3,496960*)
UNE	-2,588827 (*-3,496960*)	-5,073635 (*-3,496960*)	-1,958071 (*-3,495295*)	-5,073635 (*-3,496960*)
LFP	-2,021531 (*-3,495295*)	-7,265319 (*-3,500495*)	-1,310260 (*-3,495295*)	-9,543474 (*-3,496960*)
POP	-1,362025 (*-3,176618*)	-7,070190 (*-3,496960*)	-1,447779 (*-3,495295*)	-7,070190 (*-3,496960*)

Prerequisite variables should be the same level constant to do the co-integration test. This condition was provided by doing ADF and PP tests. 4 numbered equations were used for JJ test and the results were given in Table-4.

Table 4: The Results of Johansen-Juselius (JJ) Cointegration Test

Ho	H1	Eigen value	Trace Stat.	0,05	Max-Eigen Stat.	0,05
r = 0	r ≥ 1	0,731345	174,2572	88,80380	67,03067	38,33101
r = 1	r ≥ 2	0,637833	107,2266	63,87610	51,79821	32,11832
r = 2	r ≥ 3	0,427308	55,42837	42,91525	28,42776	25,82321
r = 3	r ≥ 4	0,263989	27,00061	28,87211	15,63201	19,38704

When Table-4 analyzed, there are maximal three vectors that co-integrated variables in a long-term. The default curve was found as 2 based on Akaike and Schwarz Criteria. Co-integrative vector equations obtained like this:

$$\partial gdp = 0{,}0042\partial lbf - 3{,}214\partial une - 0{,}00106\partial pop \quad (5)$$

According to 5 numbered equation, 1 unity rise in labor increases GDP as 0,004 in a long-term. 1 unity rise in unemployment cause to fall of GDP as 3,214, and 1 unity rise in population cause to fall of GDP as 0,00106.

4. Conclusion

The economy of Turkey (1987-2012 average 4,22%) that has the high growth rates, also has the high population growth rate (2,1%). Yet, unemployment rate is also quite high as average 8,52 inter annual 1987-2012.Although, the labor force rate in OECD countries is 70,93% since 2012, it seen that the labor force rate is very low in Turkey. The labor force rate should be increased to accelerate the growth. Therefore, the first suggestible aim is to increase the number of women to the working population. And, the growth rate will be supported with the variables cointegrate in a long term and with the politics based on increasing employment. In particular, the fall in GDP after the unemployment increased, and if the unemployment issue is solved in the economy of Turkey (at least, fall to the natural unemployment level), it is shown that may be accessed to the high growth potential.

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